

Application No. 10/082,036

Confirmation No. 9501

Attorney's Docket No. 09367.0019-01000

AMENDMENTS**In the Claims**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-23 (cancelled)

Claim 24 (currently amended): A method of evaluating the effect of an agent on a biological condition, the method comprising:

- (a) providing a first cell culture of cells of a first cell type and a second cell culture of cells of a second, different cell type in a microenvironment in which the cells of first and second cell cultures share a common medium, wherein the first and second cell types interact as part of the biological condition;
- (b) exposing the first and second cell types in the microenvironment to the agent;
- (c) imaging the first and second cell types after exposure to the agent; and
- (d) quantitatively evaluating one or more images obtained in (c) to generate a phenotypic fingerprint of the cells wherein said phenotypic fingerprint comprises a group of scalar or vector descriptors wherein said descriptors characterize morphological or compositional features of a cell; and
- (e) determining how the agent affects the first and second cell types by comparing said phenotypic fingerprint generated in (d) with a phenotypic fingerprint of one or more reference cells, thereby predicting the effect of the agent in treating the biological condition.

Claim 25 (original): The method of claim 24, wherein quantitatively evaluating one or more images identifies at least one of a change in migration pattern, growth rate, endocytosis,

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cell shape, and extracellular matrix deposition of the cells of at least one of the first and second cell cultures.

Claim 26 (original): The method of claim 24, wherein the agent is a drug candidate.

Claim 27 (original): The method of claim 24, wherein the biological condition is a disease.

Claim 28 (original): The method of claim 24, wherein the biological condition is normal unperturbed functioning of an organ or tissue and the agent causes one or more of the cell types to become abnormal.

Claim 29 (original): The method of claim 24, wherein the common medium is a cell growth medium or a cell support medium.

Claim 30 (original): The method of claim 24, wherein the microenvironment comprises:

a first compartment in which the first cell culture is grown, and
a second compartment in which the second cell culture is grown, and
wherein the common medium contacts the first and second compartments and the first and second cell cultures.

Claim 31 (currently amended): A method of evaluating an agent's effect on a biological condition, the method comprising:

(a) exposing cells of a first cell type and cells of a second, different cell type to the agent, wherein the first and second cell types interact in producing the biological condition;

(b) imaging cells of the first and second cell types after exposure to the agent;

(c) quantitatively evaluating images obtained in (b) to generate a phenotypic fingerprint of the cells wherein said phenotypic fingerprint comprises a group of scalar or vector

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descriptors wherein said descriptors characterize morphological or compositional features of a cell; and

(d) identifying any effects of the agent on the cells of the first and second cell types by comparing said phenotypic fingerprint generated in (c) with a phenotypic fingerprint of one or more reference cells; and

(e) based upon any effects identified at (d), predicting the agent's effect on the biological condition.

Claim 32 (original): The method of claim 31, wherein quantitatively evaluating one or more images obtained in (b) to identify any effects of the agent comprises identifying changes in at least one of the viability, the function, and the morphology of the cells of at least one of the first and second cell types.

Claim 33 (original): The method of claim 31, wherein quantitatively evaluating one or more images identifies at least one of a change in migration pattern, growth rate, endocytosis, cell shape, and extracellular matrix deposition of the cells of at least one of the first and second cell cultures.

Claim 34 (previously presented): The method of claim 31, wherein the agent is a chemical compound or a biological material.

Claim 35 (cancelled)

Claim 36 (original): The method of claim 31, wherein the biological condition is a disease.

Claim 37 (original): The method of claim 36, wherein the biological condition is a cancer, Type I diabetes, Type II diabetes, a neurodegenerative disease, a cardiovascular disease, or an auto-immune disease.

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Claim 38 (original): The method of claim 31, wherein the biological condition is normal unperturbed functioning of an organ or tissue and the agent causes one or more of the cell types to become abnormal.

Claim 39 (withdrawn): The method of claim 31, wherein the biological condition is a cancer, wherein the first cell type is a cancerous epithelial cell type and the second cell type is a mesenchymal cell type, and wherein the first and second cell types are from the same tissue or organ.

Claim 40 (withdrawn): The method of claim 31, wherein the biological condition is a cancer, wherein the first cell type is a cancerous epithelial cell type and the second cell type is an endothelial cell type, and wherein the first and second cell types are from the same tissue or organ.

Claim 41 (withdrawn): The method of claim 31, wherein the biological condition is a cancer and wherein the first cell type is a cancerous cell type and the second cell type is an immune system cell type.

Claim 42 (withdrawn): The method of claim 31, wherein the biological condition is an auto-immune disease, and wherein the first cell type is an immune system cell type and the second cell type is a different cell type that is attacked by cells of the first cell type in the auto-immune disease.

Claim 43 (original): The method of claim 31, wherein the biological condition is a neuro-degenerative disease, and wherein the first cell type is a neuron cell type and the second cell type is a neuroglial cell type.

Claim 44 (withdrawn): The method of claim 31, wherein the biological condition is Type II diabetes, and wherein the first cell type is a muscle cell type and the second cell type is an adipocyte cell type, an immune cell type, or a vascular cell type.

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Claim 45 (withdrawn): The method of claim 31, wherein the biological condition is cardiac disease, and wherein the first cell type is a cardiac myocyte and the second cell type is a stem cell, primary cell, fibroblast or endothelial cell of cardiac origin.